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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/833,268	04/11/2001	Nathan Jacob Litke	01339.0005.NPUS02	3516

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EXAMINER

SEALEY, LANCE W

ART UNIT	PAPER NUMBER
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2671

DATE MAILED: 05/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/833,268

Applicant(s)

LITKE ET AL.

Examiner

Lance W. Sealey

Art Unit

2671

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 April 2001.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9-17, 18/9, 19/9, 20/9, 21-25, 27, 29, 35 and 37 is/are allowed.
- 6) ☒ Claim(s) 1, 18/1, 19/1, 20/1, 28 and 33 is/are rejected.
- 7) ☒ Claim(s) 2-8, 18/4, 19/4, 20/4, 26-28, 30-32, 34 and 36 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All   b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |                                                                                                              |                                                                             |
|--------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input checked="" type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)              | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>4</u> . | 6) <input type="checkbox"/> Other: _____                                    |

Art Unit: 2671

## **DETAILED ACTION**

### ***Allowed and Allowable Subject Matter***

1. Claims 9-17, 18/9, 19/9, 20/9, 21-25, 27, 29, 35 and 37 are allowed, and claims 2-8, 18/4, 19/4, 20/4 and 34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

2. The following is a statement of reasons for the indication of allowable subject matter: No prior art anticipates or suggests, in a method of subdividing a first mesh representation of an object surface bounded by one or more boundary curves to form a second subdivided mesh representation, detail vectors (claims 2-3, 9, 21, 34 and 35), subdividing the second mesh representation one or more times until any error between it and the object surface is less than a prescribed tolerance value (claim 4), determining the location of an interior vertex in the second mesh representation by weighting the locations of adjacent vertices in the first mesh representation and adding the weighted locations (claim 5), determining the location of a corner vertex in the second mesh representation by setting it to the location of the corner vertex in the first mesh representation (claim 6), and determining the location of a boundary vertex in the second mesh representation by determining one or more parameters of a boundary curve corresponding to adjacent vertices in the first mesh representation, weighting the one or more parameters, and adding the weighted parameters to determine a parameter for the boundary

Art Unit: 2671

vertex (claim 7).

3. Claim 3 is allowable because it depends on claim 2; claims 18/4, 19/4 and 20/4 are allowable because they depend on claim 4; claim 8 is allowable because it depends on claim 7; claims 10-17, 18/9, 19/9 and 20/9 are allowed because they depend on claim 9; claims 25, 27 and 29 are allowed because they depend on claim 21; claim 36 is allowed because it depends on claim 34; and claim 37 is allowed because it depends on claim 35.

***Objections to Other Claims***

4. Claims 26, 28, 30-32 and 36 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from any other multiple dependent claim. See MPEP 608.01(n). Accordingly, these claims have not been examined on the merits.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 18/1, 19/1, 20/1, 28 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eck et al., "Multiresolution Analysis of Arbitrary Meshes" ("Eck") in view of

Art Unit: 2671

DeRose et al. ("DeRose", U.S. Pat. No. 6,489,960) and Konno (U.S. Pat. No. 6,198,979).

7. Eck, in disclosing a method for storing complex meshes in a simple, unified and theoretically sound manner, also discloses, with respect to claims 1 and 33, a method of subdividing a mesh representation of an object surface comprising a plurality of tessellated polygons, each of the polygons having one or more vertices; the method comprising:

- subdividing one or more of the polygons into child polygons, each of the child polygons having one or more vertices (1. Partitioning within the section "3 Overview of Remeshing"); and
- determining locations of the vertices of the child polygons (1. Partitioning within the section "3 Overview of Remeshing": "Identifying each of the m vertices or nodes of the triangulation" necessarily includes identifying the locations of the vertices.).

8. Eck does not disclose forming a second subdivided mesh representation. However, this element is disclosed by the DeRose method of hybrid subdivision at col.14, ll.25-30.

9. Therefore, it would have been obvious to one of ordinary skill in the art at the time this invention was made to combine the Eck and DeRose methods. This would produce a more efficient modeling of objects (DeRose, Abstract, second sentence).

10. However, neither Eck nor DeRose disclose bounding with boundary curves. This element is disclosed by the Konno method and system for generating free-form surfaces at col.6, ll.35-38.

Art Unit: 2671

11. Therefore, it would have been obvious to one of ordinary skill in the art at the time this invention was made to combine the Eck-DeRose method with the Konno bounding. This would produce smooth curve continuity (Konno, col.2, ll.29-37).

12. The other claims in this rejection will now be considered. With respect to claim 18/1, the mesh mentioned in the Eck "Overview of Remeshing" section is the representation of the object surface.

13. Concerning claims 19/1 and 20/1, Eck impliedly discloses a memory/processor readable storage medium in the section marked "1 Introduction" where it is specified "such meshes are notoriously expensive to *store*" (italics added by examiner) and then "Multiresolution analysis offers a promising new approach for addressing these difficulties in a simple, unified, and theoretically sound way."

14. Regarding claim 28, Konno discloses a CAD system in col.1, ll.15-19.

15. Accordingly, in view of the foregoing, claims 1, 18/1, 19/1, 20/1, 28 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eck, DeRose and Konno.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the Office should be directed to the examiner, Lance Sealey, whose telephone number is (703) 305-0026. He can be reached from 7:00 am-3:30 pm EDT Monday-Friday.

Art Unit: 2671

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Zimmerman, can be reached at (703) 305-9798.

**Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks

Washington, D.C. 20231

**or faxed to:**

**(703) 872-9314 (for Technology Center 2600 only)**

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive,  
Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office at (703) 306-0377.

Respectfully submitted,

*Lance W. Sealey*  
Lance W. Sealey, examiner